SIGNAL TIMING DEVELOPMENT

The goal of this task was to develop optimum signal timings and progression alternates for each of the eight study corridors. This included the evaluation of the existing signal timing plans in order to make recommendations for improvements to the cycle lengths, phase sequences and phase splits to improve mobility through the corridors.

Focus Area Analysis

In order to provide efficient signal timing coordination, it is important, at times, to include intersections that are not part of the corridor but are adjacent to the study corridor(s). A focus area analysis was conducted prior to the initiation of the signal-timing task. The purpose of the focus area analysis was to identify intersections that are not along the study corridors but are in close enough proximity that they impact, or are impacted by, traffic and signal operations along a corridor. The criteria developed for the focus area analysis, described in the "Focus Area Analysis Technical Memorandum", June 2002, provided in Appendix A, included:

- Directional traffic volumes by time period
- Heavy turning movement volumes at controlling intersections
- Repetitive traffic patterns and associated congestion
- Continuity (i.e., interactive relationship to other corridors)
- Critical intersection(s) or flow links
- Regional importance
- Priority, relationship and proximity of the study corridors
- Physical/natural boundaries
- Signal timing characteristics, including pedestrian crossings
- Traffic signal grouping characteristics and local flow links

Utilizing the above criteria, it was determined that the intersection of 13th Street/South Street should be included in the analysis of 9th/10th Streets and 16th/17th Streets. Also, the intersection of 17th Street/Van Dorn Street should also be included in the analysis of 16th/17th Streets. Since four of the study corridors traverse through the downtown area, it was concluded that all other intersections within the downtown area would be included in the signal timing analysis and signal timing adjustments would be made to these intersections, as necessary, in order to maintain vehicle progression in the downtown area along non-study corridors, such as 14th Street and "P" Street, as much as possible.

Along Normal Boulevard, the intersection of 40th Street/South Street was included in the analysis due to its proximity with 40th Street/Normal Boulevard and South Street/Normal Boulevard. Also, the intersection 11th Street/Saunders Avenue was included in the analysis of Cornhusker Highway.

Existing Conditions

AM Peak, Midday and PM Peak hour turning movement counts, lane configurations, posted speed limits and signal timing information were collected as part of the data collection effort for existing conditions. This information was used to update the City's existing traffic model (Synchro).

Signal Timing Analysis

Signal timing analyses were performed with the assistance of two nationally accepted computer software packages, TSPP-Draft and Synchro, in developing optimized signal timing splits, cycle lengths, offsets and lead/lag phasing sequences.

The first step was the analysis of each sub-system for each corridor based on optimization of individual intersections without regard to system cycle length constraints. This analysis was based on the individual traffic demand at each intersection and the most efficient split to accommodate the individual demand.

The second step was to analyze each intersection as an element of the corridor with cycle length constraints. This analysis incorporated factors such as distance between intersections, cross-street traffic volumes and relationship to other coordinated corridors within the City of Lincoln signal system. In this analysis, priority was first given to signal timing progression on primary corridors. After primary corridors were optimized, other less critical or less demanding corridors were optimized for vehicle progression where it was possible and logical.

Signal Timing Implementation

The recommended signal timing modifications were presented to City of Lincoln staff for preliminary approval. Once approved, the timing information was programmed into the City's central computer system (ACTRA) and any timing discrepancies were identified and

resolved. After programming and implementing the modified timings, field reviews were conducted to review the operation of the timings and make any necessary adjustments in cycle lengths, splits and offsets based on observed traffic flow characteristics. A summary of the signal timing changes made to the eight corridors and the downtown area is included in Appendix B. These summaries include signal timing cycle length, split, offset and phase sequence changes for each intersection.